

Design Tradeoffs the Forward Auction



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DISCLAIMER



1. I am consulting for T-Mobile on topics related to the incentive auction.

2. All opinions I express are mine and not those of T-Mobile.

Main Design Issues

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New Issues:

- Clearing Rule as a Package Reverse Price
- Adjusting Targets and interaction with Reverse Auction

Old Issues:

- Exposure Problems
- Threshold/Free Rider Problems

NEW ISSUES I



SATISFYING THE CLEARING RULE

Package-Wide Reserve Price

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- The clearing rule has a similar effect to a package-wide reserve price.
 - Difference: if it is not met, the auction does not end yet.
- As in the case of small bidders competing against a package bidder, it creates the free-rider/threshold problem.

Problem with the clearing rule

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- Suppose there are 2 areas with 1 license each.
- The clearing rule is set at 110 total.
- 3 bidders with values:

Bidder	Value for license A	Value for license B
1	50	50
2	60	0
3	0	60

- Problem: the forward auction ends at price 50 and the clearing rule is not be satisfied,
That is inefficient.

Example of the free-rider problem

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Bidder	Value for license A	Value for license B
1	50	50
2	60	0
3	0	60

- **Idea: Extended Rounds:** since the auction has not cleared, why don't we continue running the price clocks to see if we can get 55 from bidders 2 and 3?
- **Worry:** It creates pervasive gaming incentives.
 - For example, bidder 2 would have incentives to bid for license B to make the clock for B go up faster than the clock for A, to make bidder 3 contribute a larger fraction of the shortfall.

Example of a free-rider problem

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Alternative Solution: take-it-or-leave-it offer:

- In the end of the auction, if there is a shortfall (\$10 in this example), each bidder is offered a take-it-or-leave-it chance to contribute its share of the shortfall
- The “share” is proportional to the value of licenses won at the end of the forward auction.
 - It also creates gaming incentives (no way to get around them), but they seem to be smaller than with extended rounds since relative prices are fixed at the end of the clock.
 - Could use instead pre-set weights, for example, MHz/pop.

Unanimity

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- The take-it-or-leave-it offer would require unanimous agreement
- Since small bidders are more likely to be overall close to being marginal, the rule should only apply to large bidders:

Proposal:

- **only bidders who are winning more than 5% of all licenses (weighted by revenue or MHz/pop) are asked to contribute to the shortfall.**

Notes

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- Alternative 1: only bidders who are winning more than 1 paired license in an area are asked to share.
- Alternative 2: bidders are asked for a fee at the beginning of the auction...
- Answers to the offer have to remain secret until the auction ends to avoid signaling.
- Hard to make it work in the reverse auction since all sellers are small.
- If no agreement, the auction continues ...

NEW ISSUES II

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ADJUSTING THE TARGET

What if the Clearing Rule is not met

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Options for reducing target:

- 1) Reduce target nation-wide?
- 2) Continue clocks in every area allowing gradual reductions to be determined endogenously?
- 3) Use a measure of area-specific gap between the revenue in the reverse and forward auction to determine where reduce supply?
- 4) Combine 2&3: only continue the clock in areas where the gap is positive or large?

Extended Rounds

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If we follow any of $\{2,3,4\}$, then knowing in every area the price needed to clear the next smaller number of licenses would help because:

- a) We can gradually reduce the target without a need to immediately restart the reverse auction.
- b) as we reduce the target in some areas, we get a reduction of the clearing threshold.

OLD ISSUES



EXPOSURE PROBLEM
FREE-RIDER PROBLEM

Exposure problem

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- risk of winning a subset of what you want in case of complementary products.
- In this auction potentially 2 dimensions
 - 1) Geographic exposure.
 - 2) Supplemental Downlink (SDL) exposure.

Geographic exposure.

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Problem: EA appear to be too small.

Potential Solutions:

- a) make the licenses MEA/REAG size
- b) or allow for MEA/REAG package bids

Both could hurt bidders interested in very small footprint because of the free-rider problem.

Issues with making the licenses MEA

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If MEA/REAG licenses:

- Since TV stations cleared on a smaller area, will we need to give up some supply (if there is a missing piece of an MEA)? Or give up generic licenses?
- Possible solution: once we know from the reverse auction which areas are impaired, form as many MEA licenses as possible and offer the residual as EA licenses.
- It solves the “overflow problem.” As we reduce the target, we can shift licenses between MEA and EA.

SDL exposure

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Exposure problem 2:

- Value of the Supplemental Downlink (SDL) may depend on whether one gets a paired license or not in a given area.

Suggestions for SDL

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- Allow bidder to withdraw SDL bids in case it wins no paired spectrum in an area? (and re-auction the SDL in that area, giving other winners the option to keep old price?)
- Sequential Auction? (Paired first SDL second?)

One more small new issue

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Assignment of specific licenses

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Another new problem that follows from use of generic licenses:
assignment

Options:

- a) Random choose order within MEA/REAG (and let the market re-trade)
- b) Assignment Auction

Issue: complicated to run the assignment round before we know whether the auction cleared.

If the value for licenses is positively correlated with the value for specific allocation, higher revenue from the forward auction in option a).

Even if the assignment auction revenues count, the revenue can go either way.

Summary

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- There are some old design questions that we have a good idea how bidders deal with and how to minimize them :
 - Exposure problem and the free-rider problem.
 - In my opinion we should not try new solutions for them since there will be many new pieces already and we should minimize the number of things that can go wrong.
- There are also new design questions that we cannot avoid:
 - Can we try to cover the shortfall in the clearing rule?
 - How to adjust the targets if clearing rule not met?